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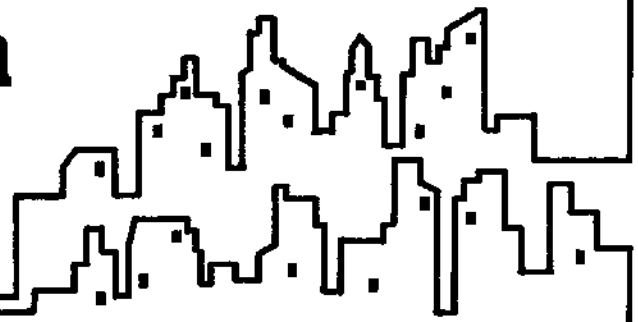


Habitat and Development

Fish, Wildlife and Environmental Laws from the Department of Wildlife

YOU CAN GET THERE FROM HERE

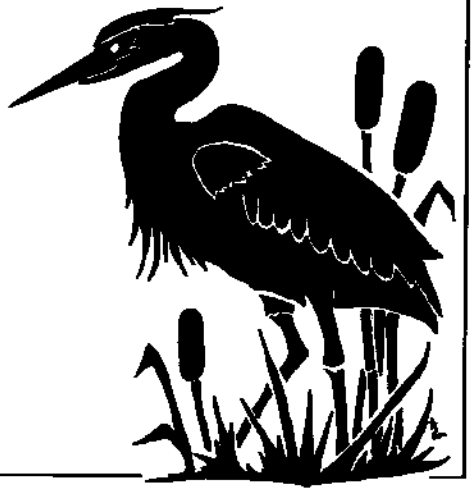
So you have a job to do. Maybe it's a small building job such as a bulkhead or dock, or a major project such as a marina. You may be a professional developer or a home builder. Whatever the case, it's likely the Washington Department of Wildlife will be involved in some way in your project.

Most major development projects affect fish or wildlife habitat, and so they also affect animal populations. Although you're probably most familiar with the Washington Department of Wildlife for our hunting- and fishing-related activities, our habitat work is equally important. The Washington Wildlife Commission, appointed by the governor, sets the policies that guide the agency, and the commission has made the establishment and maintenance of quality wildlife habitat our number one priority.

It often isn't until a permit is applied for — whether it's a so-called "natural resources" permit or a building permit — that the person wanting it finds out about the regulations that surround the permit. Usually that's when the builder or contractor finds that agencies may restrict his operation in some way or even deny his project under authority given them by state or federal law.

This pamphlet should help you understand the importance of habitat and how projects can affect fish and wildlife. While it doesn't list all laws that may affect your work or how other agencies might view your proposal, it does explain the jurisdiction and authority of the Washington Department of Wildlife in such matters and what you can expect from the agency as your work progresses.

A Pamphlet on Fish, Wildlife and Environmental Laws



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FISH AND WILDLIFE HABITATS

Why Is Habitat Important?

Habitat is the combination of food, water, cover, and space that enables animals to survive. For people, this is made up of buildings, roads, and open spaces which shelter us, provide employment, allow us to grow and distribute food, travel from one area to another, and engage in recreation. We flourish when these things are in ample supply. We don't survive when our critical needs are not met.

The same is true for wildlife. Without enough food and water, room to breed and give birth, protection from predators, and territory to meet these needs through all seasons, animals perish. A certain piece of habitat cannot provide for unlimited numbers. Because reproduction is fast, animals quickly fill available space. Therefore, most habitat is full or, at its "carrying capacity." When land is developed, habitat is lost and wildlife perishes. Some animals die directly, others in competition for alternate territory. The ability of land to support wildlife is diminished as long as the development remains in place.

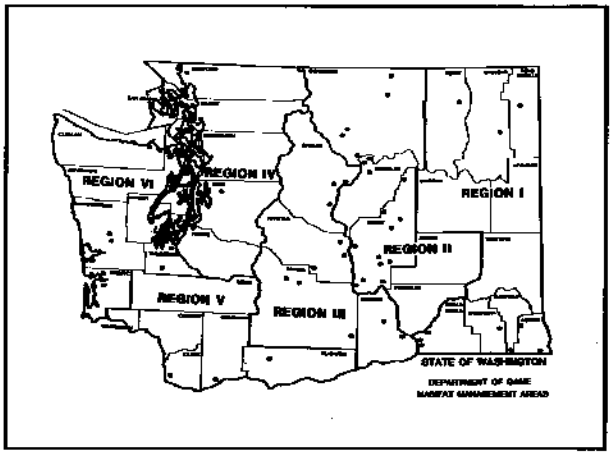
How We Manage Habitat

The Washington Department of Wildlife (WDW) owns land throughout the state which is managed directly for fish and wildlife purposes. These are called Wildlife Management Areas (WAs) and are open for hunting, fishing, hiking, bird watching, picture taking, and nature study.

We also manage habitat through authority given us by state and federal laws. This is the process described throughout this pamphlet. These habitat protection laws are listed and described in the next chapter.

After looking at your proposal, we may recommend that you make changes in siting, design, size, or timing. Often we can require you to make these changes. In a few cases, we may deny a permit for your project.

Our aim in this process is to minimize impacts on wildlife while accommodating development. We try to help you avoid building in valuable habitats and to design your project to retain as much wildlife as possible.



Habitat Types

This section will give you an idea of the value of different kinds of habitat. Not every type will be covered, but we will describe a variety of important habitats across the state. You also will learn about a few of the wildlife species which depend on each type. We will show you some of the values we try to protect by using state and federal laws.

Edge

Each animal has distinct habitat requirements. To support the great wealth and variety of wildlife we have in Washington state, their habitat must be located properly and maintained in sufficient quantity and quality. How different habitats are arranged is important because most animals require more than one kind of habitat to survive. An animal's natural range must provide for all of its needs

Where two or more habitat types come together, there is an "edge". The border between forest and clearcut is an example. Where streambank vegetation ends and water begins is another. Such areas are extremely valuable to wildlife because they satisfy diverse needs in one location. Deer feed on shrubs and weeds in clearcuts and find protective cover in the nearby forest. Animals drink water from streams and use bank vegetation as food and cover for escape or migration. Edge provides diversity. Diverse habitats support a greater variety of wildlife than single types.

Steppe and Shrub Steppe

This habitat type covers over 24,000 square miles in the rain shadow east of the Cascade Mountains. It is the arid basin area featuring grasses, sagebrush and other dryland vegetation. It also includes fairly lush upland meadows with grasses and herbs. Edges are obvious along streams and

Where two or more habitat types come together, there is an "edge."

waterways. Ring-necked pheasants prosper where steppe is interspersed with edges created by agriculture. Native steppe is critical habitat for sage grouse, long-billed curlews, ferruginous hawks, Swainson's hawks, golden eagles, burrowing owls, vesper and sage sparrows, pygmy rabbits, and white-tailed jack rabbits - all considered threatened or species of concern within the state. More common animals using steppe and shrub steppe are white-tailed deer, coyotes, badgers, and Columbia ground squirrels.

Farmland

Development of irrigated agriculture has created some unique and valuable habitats. Wetlands, water impoundments, seep areas, canal rights-of-way, fence rows, wasteways, and odd parcels of unfarmed lands are products of farm irrigation. Each feature creates edge. Together, they provide key habitat for nesting, rearing, and wintering wildlife.

Open water areas associated with reservoirs, canals, and wetlands are breeding and wintering sites for waterfowl and

shorebirds. Upland birds and songbirds are numerous in vegetation next to seeps and drainage courses. Reservoirs and wasteways often support valuable populations of resident fish. Forage and pasture crops provide food, especially for geese and ducks. These waterfowl heavily use grain fields during spring, winter and fall. Orchards have nest sites for mourning doves, perches for songbirds, hunting territory for hawks and owls, and cover for upland birds. Use, however, is affected by overhead irrigation or pesticide application.

Farming of drylands creates edges along draws, springs, rocky coulees, and forested uplands. Pheasants, quail, and partridge use grain fields and unfarmed land for nesting and brushy areas for wintering. Deer are common to wheat field borders. Numerous species of rodents are prey for a variety of hawks and owls.

Grassland

There are several types of grassland. Savannas feature single or scattered groups of trees. Meadows once were lakes where sediment and organic material have completely replaced open water, leaving a grass plant community. Range land is usually native vegetation which is cropped by domestic stock and grazing wildlife. Pastures are smaller areas of cultivated grasses. Edge occurs at boundaries with forests, watercourses, and farm lands.

Wildlife typical of grassland are similar to those found in agricultural areas. Rabbits, pocket gophers, foxes, coyotes, and deer are common. Some perching birds are adapted to grasslands, but require trees for nesting. The open nature of these habitats provides good hunting for birds of prey which feed on insects, snakes, and small mammals.

Seasonal Range

Some big game animals and game birds migrate between summer and winter habitats. Winter range is generally the more critical component. Animals tend to concentrate during cold weather. The quantity and quality of these winter habitats largely determines wildlife survival from one year to the next. Furthermore, because of their relative scarcity and high intensity of use, winter ranges are very sensitive to alteration.

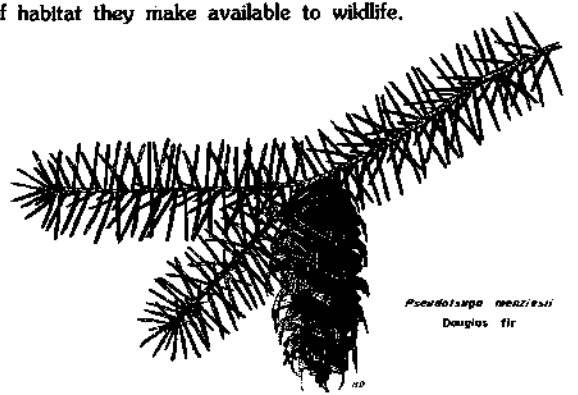
Typical winter range is at low elevation and has forage available for use by wildlife. South-facing slopes are preferred since they have less snow and temperatures are more moderate. Dense forests are used during extreme cold. At times, deer, elk, and other animals move onto farm lands to take advantage of food available there.

Summer ranges are generally much larger than winter ranges and are higher in elevation. Typically, they consist of sub-alpine meadows and forests and include north-facing slopes. The growing season of plants used by wildlife is shorter. Areas most heavily used are usually close to water.

The quantity and quality of these winter habitats largely determines wildlife survival from one year to the next.

Migration Routes

Certain physical features provide safe, convenient travel routes for animals. Streams and their riparian vegetation are used by many species to provide access from one habitat to others. Big game animals travel along ridge lines and through valleys in migration between summer and winter ranges. Migratory birds often follow identical routes year after year. Though travel routes or corridors may not be used in all seasons, they are important for the amount of habitat they make available to wildlife.



Forests include many different habitats which suppport a high diversity of wildlife.

Second-Growth Forests

As a result of intensive logging, second growth is the most common land cover in western Washington. Douglas fir dominates, though red alder and bigleaf maple are common broadleaf species. Forests include many different habitats which support a high diversity of wildlife. Logging has created many edges where cutover land adjoins uncut areas. Logging, however, sometimes reduces edges and destroys valuable habitats.

Both broadleaf and coniferous trees provide thermal and escape cover for deer and black bear, as well as birds and smaller mammals. Understory vegetation and fallen logs are cover for birds, bobcats, hares, skunks, raccoons. Snakes, frogs, and small rodents often hide in the lower ground cover. Diversity of habitats is usually directly related to physical conditions, such as slope, soil, precipitation, as well as canopy denisty and understory layering.

Old-Growth Forests

The term "old growth" refers to conifer forests at least 250 years old. Such stands may be dominated by Douglas fir, western hemlock, western red cedar, and at higher elevations, Pacific silver fir. Though they once covered most of western Washington, only small stands now remain primarily in national parks and national forests.

Old growth creates its own edge which features a tall, uneven canopy in stands with uneven age structure. The understory is dense; standing dead trees (snags) and fallen logs are common.

These conditions create diverse, valuable habitat which supports a large variety of wildlife. Spotted owls are dependent on large stands of old growth. Deer, elk, and mountain goats find food and thermal cover in these forests during heavy snowfalls. Bald eagles and goshawks nest in tall old-growth trees. Snags are needed by cavity-nesting birds and mammals, and fallen logs are home for many species of small mammals and amphibians.

Fish also benefit from old-growth forests. Because runoff is trapped and released slowly, stream flows are more constant and water quality is high. The dense canopy helps control water temperature through shading. Large logs which fall into streams help filter sediments, stabilize banks, and create aquatic habitats. This, in turn, increases amount and kind of food available to fish.

Wetlands and Riparian Areas

Wetlands are areas with wet soils or vegetation associated with wet soils. Included are fresh and salt water marshes, bogs, swamps, intertidal areas, sloughs, potholes, wet meadows, wet forests, river overflows, beaver ponds, and natural ponds. Riparian areas are lands adjacent to rivers, lakes, springs, and other wetlands. They are a transition between aquatic and upland habitat and have elements of both.

Wetlands and riparian areas have higher fish and wildlife use than other habitats. Waterfowl, shorebirds, raptors, big game, small mammals, furbearers, reptiles, amphibians, and fish depend on riparian areas for food, cover, or breeding territory. They are also used as corridors for movement and migration of wildlife between habitats. Wetlands are critical habitat for at least part of many animals' life cycles. Both wetlands and riparian zones are in relatively short supply, and many species found there are highly vulnerable to changes in their surroundings.

These wet areas have values in addition to fish and wildlife production. Reduction of erosion, natural water storage, ground water recharge, water treatment, and flood protection are all provided by wetlands and riparian areas. They are useful for education, scientific research, aesthetics, and recreation. The high cost of replacing these functions emphasizes the value of leaving wetland and riparian areas in their natural state.

Lakes

Lakes support a wide range of aquatic life, from microscopic plants to large fish. Some of the factors which influence productivity are water temperature, dissolved oxygen content, food availability, and salinity. Trout need cool water and high concentrations of dissolved oxygen. Spinyrays (bass, perch crappie, sunfish, etc.) thrive in higher temperatures and need plants such as pond lillies and coontail as spawning habitat. Though all areas of a lake are important, the littoral zone usually contains the greatest variety of organisms. This near-shore area, where sunlight can penetrate to the bottom, produces a unique combination of food and protection particularly valuable for fish.

Lakes support a wide range of aquatic life, from microscopic plants to large fish.

Streams

A stream is water moving downhill in a defined channel with permanent or intermittent flow. It serves as pathway

for movement of fish, insects, nutrients, and gases. The aquatic system is complex and dynamic. Oxygen is brought to developing fish eggs buried in stream bottom gravel and poisonous waste products are carried away. Insects are swept downstream to feeding fish. Trout and salmon migrate to the ocean to grow and mature then return upstream for spawning. Spawned-out salmon die in these watersheds where they deposit nutrients and provide food for eagles, bears, and other animals. Floods then bring these nutrients to riparian areas where they contribute to rapid growth of vegetation. Leaf litter adds stream nutrients which eventually provide nourishment to estuaries.

Streams are moving systems which feature a continuous edge relationship with uplands. Because of this active nature, changes in flows or in riparian habitats generally have impacts which spread downstream from the point of disturbance.

Estuaries

Estuaries occur where fresh waters from rivers or creeks meet and mix with salty marine waters. Here, interaction of tides and streams creates traps where nutrients concentrate. Plants grow year-round. Net productivity is probably higher than in any other ecosystem in the state of Washington. Because of this, estuaries are economically valuable food producing zones. They are net exporters of food energy.

This productivity supports a great deal of fish and wildlife. Tidelands are especially valuable, fostering growth of eelgrass, algae, and microscopic aquatic plants. These plants are eaten by insects, snails, worms, crustaceans, fish, shorebirds and waterfowl. This is a vast and diverse food chain whose influence extends to upland predators and to upstream and oceanic fisheries.

The importance of estuaries to commercial and recreational fish resources cannot be overstated. Oysters, clams, shrimp, and crab spend all or critical parts of their lives in estuarine tidelands. The same can be said for important food and bait fish such as anchovy, herring, smelt, flounder, rockfish, and sturgeon. Salmon and trout feed in estuaries during migration and use the brackish waters to prepare themselves for the change from salt to fresh or vice versa. In all, close to 60% of U.S. fisheries are based on species requiring estuarine habitat.

LAWS WHICH PROTECT HABITAT

State and federal laws which may bring you in contact with the Washington Department of Wildlife are described in this section. We will tell you which agencies administer various permits and describe how much authority we have under each law. In each case, we will describe procedures we use for reviewing your project.

> "Technical features of these statutes, exemptions and other details are not included here. Our goal is to present a "non-legal" explanation for citizens affected by these laws. Copies of the laws are available for detailed review of specific language. Please refer to RCW and other references."

STATE LAWS

State Environmental Policy Act - RCW 43.21C; enacted 1971.

What It Is - The State Environmental Policy Act, commonly referred to as SEPA, affects all state, county, city, and other jurisdiction laws, regulations, and policies. It was enacted to assure that the environment is given appropriate consideration in state and local permit decisions. This is accomplished by requiring information on potential impacts from a project. Environmental impact statements (EIS) and determinations of non-significance (DNS) are the documents used to carry this information.

What You Do - One of the agencies where you apply for a permit will be the "lead agency" for your project and will guide you through the SEPA process. Usually this will be a local agency (city or county planning department), although sometimes the Washington departments of Ecology or Natural Resources will perform this task. The Washington Department of Wildlife will not usually be the lead agency unless only Hydraulic Project Approval (HPA) is needed.

You will be asked to fill out an environmental checklist describing your project, its location, and its potential impacts. If your proposal is small, a DNS will usually be issued. For a large project, or a small one which poses large impacts, an EIS will be necessary. In that case, it is likely you will be required either to write it or to have it written. The lead agency will be responsible for circulating the document to other agencies and the public. Review periods are 15 days for a DNS and 30 days for an EIS.

What We Do - The Washington Department of Wildlife reviews and responds to environmental documents prepared by other agencies. We comment on their accuracy in the areas of fish, wildlife, vegetation, surface waters, and recreation.

Our responses often contain recommendations for reducing impacts to these resources.

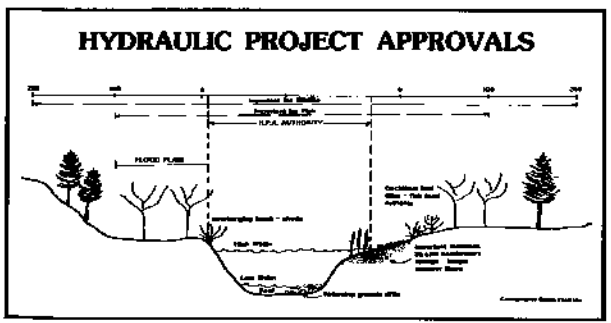
By the terms of SEPA, we use information in these documents to make permit decisions. Also, by its terms, we cannot sign off on any permit until the SEPA process is complete and a final EIS or DNS is issued by the lead agency. This may cause some delay in the normal permit process, but you can minimize the extra time by filling out and returning your environmental checklist quickly.

Hydraulic Code - RCW 75.20.100, .103 and .106; enacted 1949.

What It Is - This law requires you to get Hydraulic Project Approval (HPA) from the Washington Department of Wildlife or Washington Department of Fisheries (WDF) before you work within the ordinary high water line of state waters. "State waters" includes marine waters, lakes, ponds, rivers, sloughs, backwaters, drainage ditches if originally a natural watercourse and even intermittent streams when dry. Just about any activity from building a bulkhead to putting in a dock to dredging for gold is covered. The purpose of this permit is to protect fish life and fish habitat.

What You Do - Application forms are available at all WDW and WDF offices. You can write or call to have them sent to you. Processing will usually be faster if you mail completed forms to the Olympia offices. If SEPA applies to your project (see previous section) and we are lead agency, we will mail an environmental checklist to you.

You must not start work until you have your HPA. Also, you should always have the approval forms at the site when work is in progress.



What We Do - When your application arrives at our Olympia office, either WDW or WDF will be assigned to perform a field investigation. In western Washington, this responsibility is shared by both agencies. The Washington Department of Wildlife handles most investigations in the eastern part of the state.

With the HPA, it is our job to make sure that fish are adequately protected. The water, vegetation, and bed materials of any watercourse make up fish habitat. Projects which alter or remove this habitat can have adverse effects on fish life.

Our field staff may set conditions specifying the type, method, and timing of project work. Approval may be denied if impacts on the fish resource would be significant. We realize that each proposal and each location is different. Permit decisions are made on a site-specific basis, so conditions put on different HPA's will often vary.

You will usually get your HPA within 30 days of our receiving your application. Complex proposals and those involving SEPA may take longer. If a situation arises where there is immediate danger of loss of life or property, our investigators can give oral approval for emergency work. A written permit will then follow.

Forest Practice Approval - RCW 76.09; enacted 1974.

What It Is - This law requires that a Forest Practice Approval (FPA) be obtained before beginning any forest practice. Most activities related to growing, harvesting, or processing timber are subject to this law. Minimum standards for forest operations have been set; the objective is to protect natural resources while maintaining a healthy forest products industry.

What You Do - The Washington Department of Natural Resources (DNR) has primary administrative responsibility

for this program. An application is a formal written request to DNR to do specific forest practices. All practices must be conducted according to the Forest Practices Rules and Regulations. You can contact the closest DNR area office about application procedures (see map).

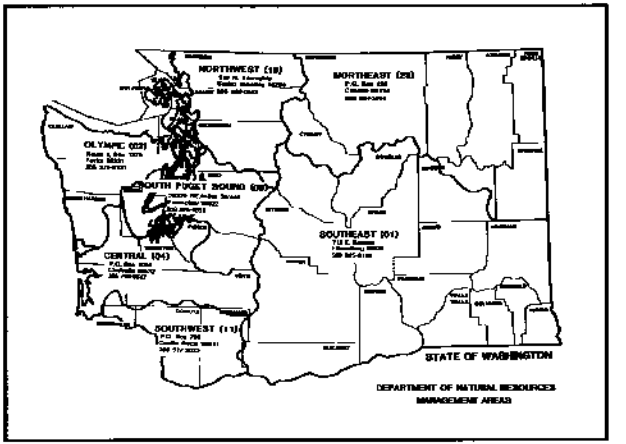
What We Do - The Washington Department of Wildlife is involved in a review and advisory capacity. Our primary obligation is to determine if Hydraulic Project Approval is also required. In addition, we may add recommendations for timing or other comments relating to fish and wildlife.

Shoreline Management Act - RCW 90.58; enacted 1971.

What It Is - Land use in certain shorelines areas of Washington is regulated by this law. Its jurisdiction includes all marine waters, streams with a mean annual flow of 20 cubic feet per second or more, and lakes larger than 20 acres. Also covered are shorelands extending 200 feet landward from these bodies of water and associated marshes, bogs, swamps, floodways, river deltas, and floodplains. Permitted uses for all land and water covered by the act are defined in local shoreline master programs. The objective is to assure that all valid projects and uses of the shorelines are accommodated in suitable areas. Projects costing over $2,500 require Shoreline Substantial Development Permits. Certain types of proposals require Conditional Use Permits.

What You Do - Contact your city or county planning department to find out if your project requires a permit. They will help you through the permit process.

What We Do - The WDW's authority here is advisory only. When local governments establish or revise shoreline master programs, we review them and comment on their effects on fish and wildlife. We try to protect these resources and maintain access to public areas for



recreation. We comment on SEPA documents and testify about fish, wildlife, and habitat for cases argued before the Shoreline Hearings Board and in court.

Response to Water Rights Applications - RCW 75.20.050; enacted 1949.

What It Is - Surface and ground waters are a public resource. It is state policy to maintain high enough stream flow to support game and food fish populations, so we are involved.

What You Do - If your project involves removing water from a stream or lake, building a dam, or some similar use, you should contact DOE to see if a water right is needed.

What We Do - We review all water right applications and do field investigations where fish could be impacted. We may request that DOE set conditions to install screens

to limit the quantity withdrawn, or to modify or eliminate a diversion structure. Where critical fish habitat could be destroyed, we may ask DOE not to issue the water right. In conjunction with other water resource laws and considerations, decisions are made by DOE.

Minimum Water Flows and Levels - RCW 90.22; enacted 1969.

What It Is - This program works in conjunction with the water rights law (see previous section). It gives DOE responsibility to establish minimum flows and water levels when necessary to protect fish, wildlife, or water quality. These must be established when requested by WDW or WDF.

Water Resources Act - RCW 90.54; enacted 1971.

What It Is - This program is closely tied to the minimum flow program. It includes policies that assure Washington's waters are used for the greatest benefit of the people. Base flows are to be retained in streams. Lakes and ponds are to be retained substantially in their natural conditions.

Fishways To Be Provided and Maintained - RCW 77.16.210; enacted 1947.

What It Is - Fishways and fish protection devices are required of anyone who manages controls, or owns a dam or other obstruction across a river or stream. Sufficient water must be provided to operate these structures and allow free passage of game fish.

Diversion of Water - Screen, Bypass Required - RCW 77.16.220; enacted 1947.

What It Is - It is unlawful to divert water from a lake, river, or stream containing game fish unless the intake device is equipped with a fish guard or screen. Specific requirements for screening and bypass are provided by WDW. Diversions which existed prior to 1947 are exempt.

Columbia River Fish Sanctuary - RCW 75.20.110; enacted 1961

What It Is - No dams or other obstructions over 25 feet high may be constructed, completed, or operated on specified tributary streams of the Columbia River. In addition, no one may divert these waters in quantities which would reduce flows below annual average low flow levels.

Bald Eagle Protection Rules - RCW 77.12.655 enacted 1984 and WAC 232-12-292

What It Is - The bald eagle is a state and federally threatened species and a public resource of concern. The legislature directed the state to protect bald eagles and their essential habitat. This law gives WDW the authority to adopt and enforce rules defining the extent and boundaries of habitat buffer zones for bald eagles. WDW cooperates with landowners and permitting agencies to develop site management plans for habitat that will be impacted by land use activities.

What You Do - If you discover or are informed by a permitting agency that your project is near a bald eagle nest or communal roost site, you should call The Nongame Wildlife Program in Olympia (206) 586-1449. A biologist will determine whether the proposed project would adversely impact eagle habitat. If the impact is likely, you should send a letter to the appropriate Department of

Wildlife regional biologist describing the proposed activity and attaching any pertinent documents or plans.

What We Do - We will contact you and the permitting agency to meet on-site to discuss management options for protection of the eagle habitat and possible incentives or compensation to you for such protection. A WDW biologist will work with you to develop a site management plan within 30 days. An agreed upon management plan will be a condition for permit approval. If agreement cannot be reached, you may refer the plan to the Bald Eagle Oversight Committee for an informal hearing to resolve the dispute or you may file a formal appeal as outlined in WAC 232-12-197.

FEDERAL LAWS

U.S. Army Corps of Engineers Permits

Rivers and Harbors Act - Sections 10 and 13; enacted 1899.

Water Pollution Control Act (Clean Water Act) - Section 404; enacted 1972.

What They Are - Programs to control water pollution and protect the nation's waters from uncontrolled modification were established by these laws. Permits are issued for work within waters of the United States and associated wetlands.

Section 10 permits are required for work in navigable waters and while Section 404 permits are required for discharge of dredged or fill material. For most types of projects, both permits are needed, but this should not take you extra time or effort as they are processed together.

Navigable waters include all marine areas, streams which are or have been susceptible to use in interstate commerce, wetlands or lakes over 1 acre in surface area and streams over five cfs mean annual flow. Marshes, swamps, bogs, sloughs, and backwaters which are connected to navigable waters are called "associated waters." The connection does not have to be direct, so if you are unsure whether a permit is needed, contact the Corps of Engineers.

What You Do - If your project affects water, wetlands or tidelands, you should contact the Corps of Engineers Office in your area to see if you need a permit. Corps office are located in Seattle, Walla Walla and in Portland, Oregon.

What We Do - At the Washington Department of Wildlife's central office in Olympia we receive a copy of the public notice describing each project proposal. We send these to our regional staffs for investigation. As with Hydraulic Project Approvals (HPA), we usually respond within 30 days, though complex projects may take longer. Unlike an HPA investigation, the focus is on potential impacts to both fish and wildlife. However, the criteria we use for decision-making are similar. Your proposal is examined to determine the value of affected habitat, potential impacts, need for the project, possible alternatives, and conditions to lessen impacts. For specifics, you should read the "large" and "small projects" sections of this pamphlet.

The Corps is required to consult with state fish and wildlife agencies on projects. Our recommendations must be given "great weight." The Corps will usually deny a permit if we object to it and will apply conditions we request for work method, project design, or timing.

Fish and Wildlife Coordination Act - 16 U.S.C. 661-667; enacted 1958.

What It Is - This law applies when a proposal involves surface waters and a federal permit is needed, or when federal funds are used for planning or construction. It requires that fish and wildlife receive consideration equal to

other project features. Federal and state fish and wildlife agencies must be consulted by project sponsors and a program developed to prevent loss or damage to these resources. The law allows for mitigation - efforts to minimize damage to fish and wildlife - through project design changes, habitat enhancement, and land purchase.

What You Do - This law does not require you to get another permit. In practice, small projects with less potential for impacts are not greatly affected. But, if your proposal is a large one, or if impacts on fish and wildlife could be substantial, more may be required of you during your federal permit process.

Since site-specific data on project impacts are rarely available, you may be asked to undertake a study of biologic conditions. Resource agencies, including the Washington Department of Wildlife, use this information to evaluate project's impacts.

Mitigation can take several forms. You may be required to change your project design to avoid damaging valuable habitat. You may be asked to improve wildlife habitat on project land. An example of this could be expanding the size of a wetland. Or you may be required to purchase land elsewhere and dedicate it to use by wildlife.

Because your plans could be substantially altered, you should read the project sections of this pamphlet to learn the major areas of impact. Try to avoid as many of them as possible in your original design.

What We Do - We look at the project site and examine your proposal in the course of our field investigation or in response to a consultation request. If more information is needed, we recommend that specific studies be done. We may contact you to start negotiation on mitigation or compensation measures. In all cases, we coordinate our efforts with the U.S. Fish and Wildlife Service and Washington Department of Fisheries so that you do not have to deal with the three agencies separately.

Federal Power Act - 16 U.S.C. 797-817; enacted 1970.

What It Is - State agencies are allowed to intervene in licensing procedures for all non-federal hydroelectric projects. Small hydro proposals are included. Conditions to protect fish and wildlife are made part of your federal license.

What You Do - Contact the Federal Energy Regulatory Commission (FERC) on Washington, D.C. to learn what licensing procedure you must follow. Before your license or exemption is granted, you must consult with Washington Departments of Wildlife and Fisheries regarding potential impacts on fish and wildlife. You may be asked to fund studies on impacts of larger, complex projects.

You will also need Hydraulic Project Approval for diversion structures, intakes, outfalls, etc. However, since the FERC licensing process can be lengthy, you should wait until your final plans and specifications have been sent through the federal procedures before applying for the HPA.

What We Do - WDW consults with you, examines your proposal and studies and inspects the site to determine potential impacts of your project on fish and wildlife. We develop a proposal for mitigation/compensation and negotiate proposed conditions with you. FERC makes the final decision where settlement cannot be reached.

Federal Energy Regulatory Commission (FERC)
825 North Capitol St. N.E.
Washington, D.C. 20426
Tel. (202) 376-9171

Surface Mining Control and Reclamation Act; enacted 1977.

What It Is - Coal mining operations are controlled by this law. The Office of Surface Mining (OSM) oversees permit procedures, operations, and reclamation plans. Consultation with various state agencies is required, and most state permits including HPAs are involved. The federal permit process is complex and lengthy and beyond the scope of this pamphlet. The Washington Department of Wildlife's involvement may be extensive, as the law gives a great deal of weight to fish and wildlife issues. You should contact OSM to learn what will be required of you.

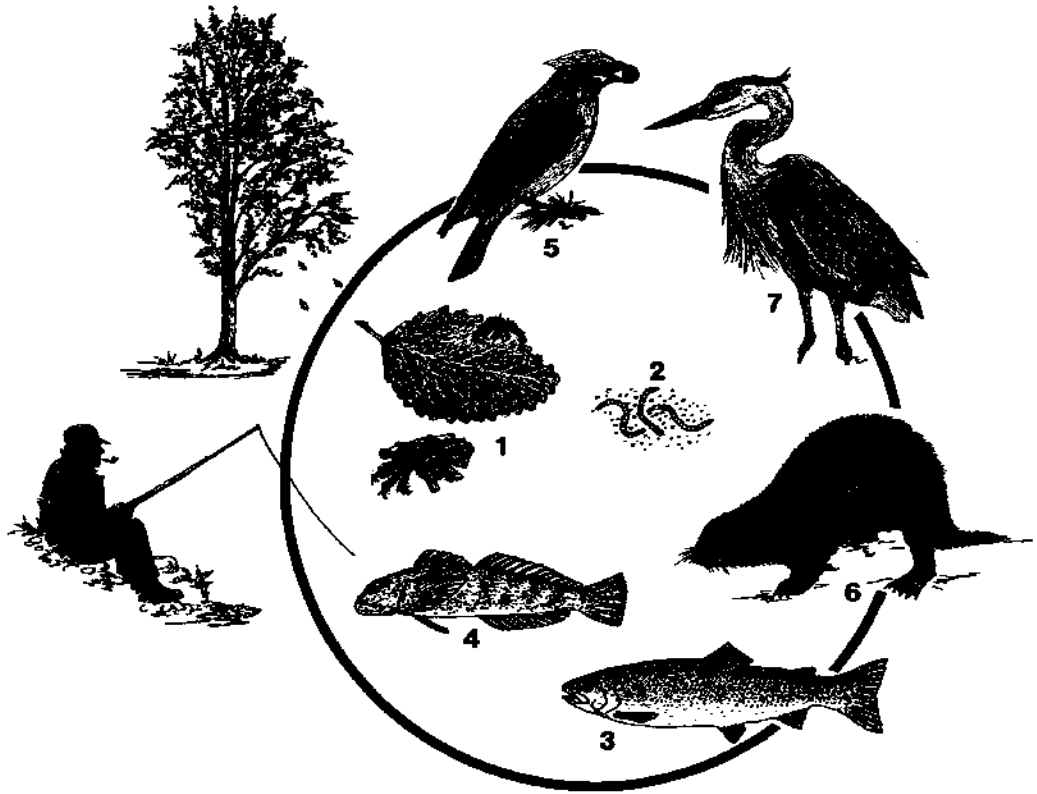
Office of Surface Mining (OSM)
1951 Constitution Ave. N.W.
Washington, D.C. 20240
Tel. (202) 343-4719

National Environmental Policy Act (NEPA) - P.L. 91-190; enacted 1969.

What It Is - This is the federal counterpart of the State Environmental Policy Act (SEPA) which has similar purposes and effects. What is required of you and what we do is virtually the same as under SEPA (see section under STATE LAWS). The lead agency for NEPA is federal. You can check with any federal agency involved in the funding, construction, or permitting of your project to find out specific requirements under NEPA.

Endangered Species Act - P.L. 93-205; enacted 1973.

What It Is - Language of this act declares that threatened or endangered species of fish, wildlife, and plants are of "esthetic, ecological, educational, historical, recreational, and scientific value to the nation and to its people..." In addition, it is federal policy to conserve these species and their critical habitats. Regulations have been developed to specify protective measures to be followed in areas where these species exist.



SIMPLE FOOD CHAIN

A leaf is skeletonized by shredding insects such as caddisfly larvae (1). This process creates finer leaf particles (detritus) eaten by: Collectors such as midge larvae (2). These insects are prey of other stream or streamside inhabitants including trout (3), sculpin (4) and cedar waxwing (5) Predators also become prey of many fishermen along the stream. Otters (6), great blue herons (7) and several other predators benefit from the cycle which began as a leaf falling into the stream.

PROJECTS

You should get an idea of types of things we look for in specific projects in this section. Not every kind of work is covered, but the list includes those proposals where the Washington Department of Wildlife has authority to require design changes or decide whether permits should be issued. You will learn what to expect from WDW as you proceed with your plans.

There are three general considerations which apply to most projects:

- All construction will alter or occupy habitat. Fish and wildlife losses occur because of this habitat loss. Therefore, a large project will cause more impacts than a small one placed in the same location.
- Impacts extend beyond the borders of your project site. Most species of wildlife are disturbed by human intrusion. The importance of this will depend on the types of wildlife using the area and on the nature of disturbance.
- Each site is unique. Habitat value and potential impacts will vary from place to place. This will often make a difference in our response.

The Washington Department of Wildlife tries to ensure that your project does not harm critical habitat. We make certain that your proposal is designed to minimize impacts on fish and wildlife while still meeting your needs.

You can read about specific features we loook for in the following sections on small- and large-scale projects. Generally, in every investigation we will examine the following items: type of project, its purpose and necessity, benefits and impacts, possible alternatives, adjacent land uses, cumulative impacts taken with other nearby developments, and the significance of the precedent which may be set. Physical and biologic questions are also answered to give us an idea of how valuable your project site is to fish and wildlife.

SMALL-SCALE PROJECTS

In our descriptions of small-scale projects the Washington Department of Wildlife concentrates on water developments. You need Hydraulic Project Approval for all of these. In most cases, a Corps of Engineers permit is also required. Though other state and federal laws often apply, they may not add to our authority significantly. Refer to the chapter on HABITAT PROTECTION LAWS for information about these permits.

Since an HPA is a permit to protect fish, we have included brief description of some of the factors which affect fish habitat and survival:

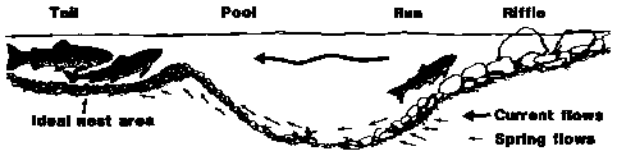
Water Quality. Cool, clean water is needed to sustain fish life. High water temperatures increase sensitivity of fish to stress and disease and decrease their ability to feed, spawn, and navigate. Removal of streamside vegetation is the most common cause of this impact. In addition, streamside plant communities are important habitats for furbearers, songbirds, and other wildlife.

High sediment levels effect fish and food-chain organisms. Aquatic plants are killed by smothering, reduction of sunlight, abrasive action, and change in composition of streambed materials. Bottom-dwelling animals are destroyed when sediments clog gills and filters or reduce living space between rocks. Fish are impacted when these food supplies are reduced; when spawning areas, eggs, or tiny young are smothered by damage to gills; and when nearby water makes it hard to see and catch food.

Watercourses. The shape and types of materials in stream beds are important in evaluating fish habitat. Riffles are shallow areas with greater slope than average for a particular section of stream. Water moves faster here, and only larger rock and gravel are deposited. This gives plenty of living space for insects that become food for fish. Riffles are also valuable as spawning areas.

Protective cover in smaller streams is provided by undercut banks, large rocks, embedded logs, and low over-hanging bank vegetation. Pools are deeper and water is relatively slow moving. They also are resting and rearing sites.

A stream must have all these physical features in abundance to support healthy fish populations. These values, however may be quickly and directly lost by dredging. When creeks are straightened or rechanneled, immediate losses occur unless habitat features are built into the new bed. These alterations also lead to indirect loss. If the length of a stream is shortened, slope is increased; scouring and increased erosion may occur both above and below the channelized portion.



Natural nest areas that most spawning trout, steelhead and salmon use. (Stream cross-section diagram courtesy Idaho Fish and Wildlife.)

Food Chain. Insects feed on aquatic and streamband vegetation. Fish in turn feed primarily on insects. When vegetation is removed by dredging or filling, insect numbers decrease and fish are impacted. Though wind currents bring insects back into disturbed areas, a new colony cannot become established until plants reestablish. Aquatic vegetation and invertebrates are also food for ducks, shorebirds, furbearers and other wildlife.

Fish are protected by minimizing adverse impacts on their habitats. To do this, the Department of Wildlife may put conditions on your HPA. Examples are listed in the following sections, by project type. Remember that these are general conditions - other provisions may be added to reflect the character of your project and its location.

Bank Protection (bulkheads, riprap, etc.)

Riprap and bulkheads should be confined to existing banks or shorelines. Often, an excavated toe will be needed to provide structural integrity. Construction activities will be restricted to elevations and time periods that protect migration, feeding, and survival of fish. Associated fills will generally be limited to the amount necessary for protection of the bank. If you are going to place riprap, we will often require you to use large, angular rock and, sometimes, to revegetate the riprapped bank or we may suggest other alternatives.

Beaver Dam Removal

Beaver dam problems are evaluated on a case-by-case basis by Washington Department of Wildlife personnel. Potential and actual damages are evaluated by property owners and wildlife control agents.

In addition to the HPA requirement, SEPA must also be satisfied when use of explosives is planned for dam removal. Dams which are more than one year old may

provide substantial fish and wildlife habitat. Requests for removal of these dams will usually be subject to critical review. In some cases, removal of beaver dams in state waters will not be allowed.

An emergency HPA may be issued when a dam causes imminent danger because of high water and wave action that endangers property. The applicant is given verbal approval to perform necessary work. Emergency actions are exempt from SEPA.

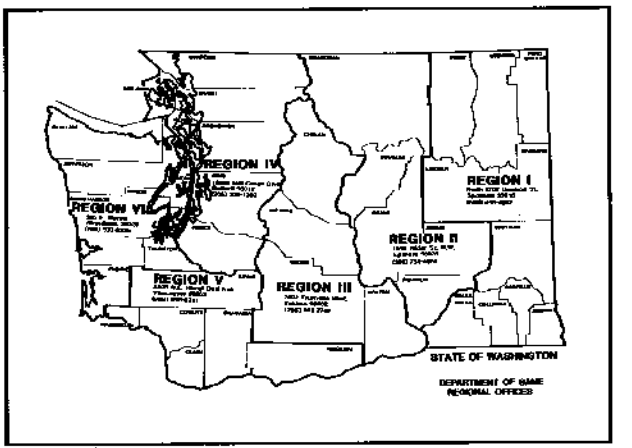
In non-emergency situations, the value of the dam will be evaluated. An authorized individual from the WDW can provide advice, but the applicant must obtain an HPA and perform the removal. Timing may be stipulated to avoid breeding and rearing times for wildlife or fish migration periods.

Authorized individuals from the Washington Department of Wildlife and the Washington Department of Fisheries have been given written permission to remove certain non-substantial dams. Specific criteria have been developed for identification of these situations. Generally, if you have a problem with a beaver dam, contact your regional WDW office to find out what procedures you must follow for your particular situation.

Bridge, Pier, and Piling Construction

All abutments, piers, pilings, and sills should be designed to not restrict stream flow or cause backwater flooding, erosion, or channel scouring. If in-water excavation is needed for support structures, you will usually be required to isolate this work from the water with dikes, cofferdams, or something similar. In marine areas, floating piers and walkways usually should be located below mean lower low water (MLLW) to avoid grounding at low tides.

Bridges should be designed to direct roadway drainage to facilities that remove silt and pollutants. Catch basins with oil and water separators can do this effectively if they are maintained regularly. Bridges should be built high enough to pass all anticipated flows and debris. Complete span bridges which avoid river floodways and wetlands are preferred. Again, timing likely will be specified. If your project involves dredging and filling, be sure to read these sections also.



Channel Changes and Realignment

When you construct a permanent channel for a stream, you will be required to make the new one similar to the old channel in length, width, depth, gradient, and meander configuration. You must also incorporate habitat features which meet or exceed those in the section of stream you are replacing. The Washington Department of Wildlife can provide suggestions on how this may be done.

Banks must be protected from erosion and disturbed areas must be revegetated even for temporary channel changes. Native plants are preferred; we will recommend

species to use. If fish are present, you may be required to have capture and transportation equipment available to transfer them to free open water. Again, conditions which stipulate timing of construction may be included to reduce impacts on fish during spawning and other critical times of their lives.

Conduit and Pipeline Crossings

Whenever possible, we prefer that pipelines and conduits be bored or jacked underneath streams. Boring and jacking pits must be isolated from surface water to avoid streambed alteration. Where trenching is allowed, excavations must be done during periods of low water and isolated by cofferdams, culverts, or other approved methods (see section on Temporary Bypass Culverts or Flumes). You will usually be required to plow, place, and cover the pipeline in a single pass of the equipment. You must also return the stream bed, as nearly as possible, to pre-project conditions. Your crossing route should be aligned to minimize disturbance to fish and wildlife.

Culvert Installation

Culverts should be large enough to pass all expected flows and debris. They also must be designed and maintained to provide unrestricted fish passage. To do this, your culvert may need special modifications. Culvert gradients should be the same as original stream gradients. Spawning areas must be maintained. Culverts placed in these areas should be the single, bottomless type. Generally, the WDW prefers placement of bridges rather than culverts.

Temporary Bypass Culverts or Flumes

As with permanent culverts, these structures should be large enough to pass all expected flows and debris. You will be required to use a sandbag revetment or other

Culvert gradients should be the same as original stream gradients.

approved methods at the inlet to divert the entire flow through your culvert or flume, and at the outlet to prevent backwater from entering the work area. Your bypass must be in place and operating before work in the stream bed may take place. Materials used for the bypass must be removed when no longer needed and the site restored to pre-project condition.

Dredging

Dredging generally is allowed only for purposes of navigation and flood control, or in areas where food fish, game fish, shellfish or their habitats would not be damaged. In most cases, you will not be allowed to dredge in spawning areas, shallow water, intertidal areas or wetlands. The Washington Department of Wildlife often requires use of silt screens, floating booms, or similar equipment to keep silting and sedimentation to a minimum. Timing may be specified to avoid interference with fish and wildlife migration, spawning, nesting or human use. Disposal of dredged material is usually limited to Department of Natural Resources open water disposal areas or approved upland locations.

Filling

Filling destroys plants and animals and permanently modifies habitat. It reduces shoreline and decreases the size of estuarine or other aquatic habitats. Filling tidelands reduces productivity because algae, eelgrass, shellfish, and other benthic communities are smothered. Loss of shallow areas increases predation on juvenile fish because areas where they can escape from larger fish are eliminated. We generally do not approve projects which involve unnecessary filling of shallow waters, intertidal areas or wetlands. Alternatives, such as construction on pilings, are almost always favored over filling. Exceptions are permitted for water-dependent projects in areas without resource value.

Gravel Removal

Gravel is taken from stream beds for commercial use and flood control. When permitted, gravel must be removed during low water when bars are exposed. This minimizes impacts on spawning beds and rearing areas.

Dredging generally is allowed only for the purposes of navigation and flood control, or in areas where food fish, game fish, shellfish or their habitats would not be damaged.

Boundary markers are sometimes required during the duration of the project. You will not be allowed to stockpile or spoil excavated materials within the ordinary high water line. At the end of each day's operation, the work area must be sloped continuously upward from the water side of the bar to the bank. Potholes cannot remain. If gravel washing or crushing is necessary, it must take place above the ordinary high water line.

For flood control agencies, districts, and jurisdictions, we strongly urge development of long-range management plans (see LARGE-SCALE PROJECTS, Flood Control Section). Fish should be protected along with measures to reduce loss of life and property. Such plans are particularly

valuable when major flood control projects are involved. Pre-and post-project monitoring of gravel recruitment and related physical factors may be required to determine potential impacts on fisheries.

Intakes and Other Water Diversion Structures

Diversions must be constructed so that fish are not trapped or entrained. You will be required to screen intakes with .25 or .125 inch mesh. Rigid material that allows water passage and excludes fish passage may be used. Water velocity at the intake should range from .2 to .5 feet per second depending on species of fish present. Screens should be cleaned regularly or designed so that little maintenance is needed. You must minimize disturbance of banks or bank vegetation and protect slopes against erosion during construction and revegetate them afterwards. You may also be required to bear costs of preventing wildlife damage to irrigated croplands (deer fencing, etc.).

Water diversion projects which entail a new water appropriation are also subject to WDW review of water-right applications coordinated through Department of Ecology. If your project includes diversion of water for generating power refer to LARGE-SCALE PROJECTS, Hydroelectric Power section.

Outfall Structures

Outfall structures must be located, constructed, and maintained to prevent entry of fish and be away from all spawning and rearing areas. They should not damage commercial or recreational fishing. Their discharge should not result in pollution of shellfish beds.

Excavation must be isolated from flowing water by a cofferdam or other approved method. Armoring rock should be placed at the point of discharge to prevent erosion or scouring of the stream bed. Structures containing concrete, cement, or wood preservatives must be cured before being put in the water. Again, you should minimize disturbance of banks and bank vegetation, protect slopes against erosion, and revegetate when work has been completed.

LARGE-SCALE PROJECTS

The following are major undertakings which usually affect large land and water areas. They have great potential for harming fish and wildlife, especially when valuable habitats are involved. These proposals are usually complex.

Environmental review and permit processing can be lengthy and you will likely have to deal with the questions of mitigation and compensation.

Mitigation and Compensation

To understand how large-scale projects are evaluated, it is necessary to look at the guiding principles used by the Washington Department of Wildlife. These come from our legislative mandate to "...preserve, protect, and perpetuate wildlife." Policies set by the Wildlife Commission state that, "The first management priority will be to establish and perpetuate the highest quality wildlife habitat."

"Mitigation" means to alleviate or make less severe. Our goal is to achieve adequate protection of fish and wildlife resources. However, when damage to habitat is unavoidable, mitigation activities are required to reduce or compensate wildlife losses. Replacement of losses — in-kind on-site — is the objective of our mitigation and compensation efforts

The Washington Department of Wildlife works with project sponsors to assure in advance that adequate measures to protect fish and wildlife are included in initial plans. Specific provisions are usually negotiated and can take a variety of forms. Funding responsibility for these

measures are assumed by the project sponsor and must be incorporated into the cost/benefit analysis of the planning process. Generally, one or more of the following is included:

- Habitat replacement, such as revegetation, restoration of filled and diked areas or creation of wetlands;
- Off-site land purchase and dedication as wildlife habitat for the life of the project or in perpetuity. The acreage required for mitigation necessarily varies according to the size of development and types of habitats impacted;
- Establishing a fund for wildlife habitat management. This might be used on an off-site purchase or on existing habitat lands. Specific expenditures might be for raising game birds, stocking fish, revegetation, fence construction, etc.

The Washington Department of Wildlife also requires studies to determine bases for mitigation and compensation. These are funded by project proponents and conducted under direction and guidance of fish and wildlife agencies. Finally, the WDG coordinates with project sponsors throughout the planning, development and operational phases of the project.

The following large project descriptions are not meant to cover every proposal which requires mitigation. For example, some marinas are small-scale developments, while others are large and involve mitigation planning. On the other hand, some hydroelectric projects are small and require only minor additions or changes. In addition, many large projects incorporate plans for the types of activities listed under SMALL-SCALE PROJECTS. Please read sections which apply to your proposal.

Flood Control

Control of flood waters is accomplished in several different ways. These include flood plain management, levees, and flood storage projects. Flood plain management — a plan for keeping or moving damage-prone development out of the flood plain — is usually the most desirable approach for fish and wildlife.

Levees. These structures reduce flood damage by increasing capacity. Some impacts on fish and wildlife are:

Shoreline levees eliminate riparian habitats. Revegetation is managed for prevention of levee damage, thereby limiting shoreline vegetation to grasses and low shrubs.

Public use of stream corridors is often severely reduced by the physical barrier created by levees. Fish and wildlife values are diminished.

Since the levees confine stream flow to a narrow corridor, increased velocity of flood flows may cause extensive scouring of the stream channel. This reduces fishery production and value.

Secondary impacts on wildlife result from developments in flood protected areas where flood plain habitats are eliminated.

Channelization prevents streams from meandering. This wandering tendency of natural stream courses is beneficial for several reasons: it dissipates water velocity and reduces scouring; it allows gravel and fines to be deposited on point bars; it provides fish and wildlife habitat by forming pools and riffles, side channels, and marsh areas. If streams are not allowed to meander, bed loads are deposited within the narrow channel which increases elevation of stream beds. Additional maintenance dredging results.

Steps to mitigate these impacts may include all or some of the following:

- Carefully select the levee route and specific construction sites to avoid critical habitats. Provide

adequate setback from the stream corridor. Avoid levee construction on stream shorelines.

- Revegetate and manage disturbed areas and levee slopes with plants beneficial to wildlife. Diversity in the species and structure of plants benefits most wildlife. Use of herbicides should be prohibited.
- Preserve fish passage to all tributaries. Streams migrating behind levees are either pumped or routed through gated structures, therefore specific fish passage systems must be incorporated.
- Avoid loss of wetland areas caused by blocking recharge of flood plains.
- Provide public access along levee rights-of-way and stream corridors.
- Adopt flood plain management plans to reduce or eliminate building within the flood plain. Include well-planned setback levees to allow the stream to meander in a natural course.

Flood storage projects. Most major impoundment projects are developed for multiple purposes, such as flood control, hydropower, municipal and industrial water supply, etc. However, some are constructed and operated specifically for flood control. Impacts from these projects are:

The flooded area replaces both stream and associated land habitats. Reservoirs for flood control are usually not permanent. Instead, they capture runoff and then are emptied to prepare for the next storm. Therefore, fisheries do not develop in these reservoirs.

Similarly, river channels behind dams are alternately flooded and exposed, thus minimizing stream fishery values.

Habitat quality is reduced by sediment build-up and elimination of riparian vegetation. Discharged sediments directly impact downstream spawning and rearing capacities

Recreational values are reduced.

Major flood control projects are constructed by the federal government, usually the Army Corps of Engineers. The Fish and Wildlife Coordination Act and National Environmental Policy Act are the most important applicable laws. Policies and priorities which guide Washington Department of Wildlife response to flood storage projects are much the same as described for Large Hydroelectric Projects.

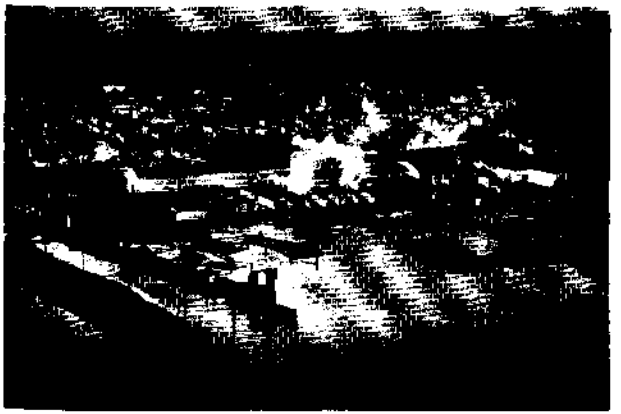
Port Developments

Historically, many port facilities were developed in estuaries. Productive wetlands and shallow water areas were destroyed through dredging and filling. Pollution from port activities continues to degrade existing habitats. Because these areas are critically valuable to fish and wildlife, (see section of HABITAT TYPES) future port developments should be designed to minimize further damage to these public resources. Loss of fish and wildlife should be compensated.

Port proposals usually include plans for many of the project types listed in the SMALL-SCALE PROJECTS chapter. Sections on bank and shoreline protection, pier and piling construction, channel changes, dredging, filling, and others which may apply to your overall plan should be read. Following are fish and wildlife impacts specifically associated with port facilities:

Loss of wetlands and shallow water habitats. Port developments often involve extensive dredging and filling of productive aquatic habitats. These impacts are severe invertebrate and plant communities are smothered; shoreline and other aquatic habitats are reduced or eliminated. (Also refer to SMALL-SCALE PROJECTS section on dredging and filling.)

Maintenance dredging for deep channels and basins. This can be an ongoing activity, with periodic and continuing impacts on fish and wildlife habitats.



Historically, many port facilities were developed in estuaries.

Water quality degradation. Oil spills, material including heavy metals, and other pollution may severely affect fish, birds, invertebrates, other wildlife, and recreation.

Disturbance. Increased human activity and noise will discourage sensitive species from using these areas.

Interruption of migration routes. Estuaries are important resting areas for migrating birds and anadromous fish.

Log rafting. Large water areas may be shaded, which prevents production of microscopic food organisms. In addition, frequent grounding at low tides can damage beach substrates and benthic invertebrate communities.

Associated upland developments. Offices, docks, loading facilities, log sorting yards, etc., replace valuable upland habitats.

Reduced recreational opportunities. Danger and inconveniences associated with ports, as well as the direct loss of habitat, precludes many recreational activities.

The Fish and Wildlife Coordination Act requires that fish and wildlife receive consideration equal to other project features. The Washington Department of Wildlife will work with you to develop plans which avoid major impacts and include mitigation measures. This should be done early in the planning stages. Our efforts are coordinated with U.S. Fish and Wildlife Service and Washington Department of Fisheries. Recommendations are site-specific, but generally may include the following:

- Location may be the most important consideration. Highly productive and sensitive areas must be preserved. Areas with good flushing qualities and tidal exchange should be selected to reduce water quality problems.
- Once a location is chosen, you may be required to identify existing habitats and fish and wildlife populations. Changes in design or location of certain project features may be required to avoid sensitive areas.
- Replacement or expansion of wetlands as well as buffer areas around wetlands or adjoining mitigation lands may be required.
- Off-site acquisition of land and dedication as wildlife habitat is often required to mitigate losses caused by port development.
- Dredging and filling should be kept to a minimum. Maintenance dredging especially can cause continuing impacts. Most dredge areas must be "daylighted" — dredged to meet existing tidal elevations or navigation channels. Timing may be stipulated. Dredge spoils, or wood waste, may not be deposited in wetland or shoreline areas.
- You may be required to develop artificial fish habitat. This may be done by constructing reefs made of rock, tires, or concrete pipe. The Washington Department of Wildlife can help you plan these projects.
- Intertidal log rafting may not be located in

productive or sensitive habitats or where frequent grounding may occur.
- Public access must be preserved and, where appropriate, enhanced.

Marinas

Either large or small marinas nearly always pose impacts which must be considered during planning. Marinas should not impact fish or shellfish unless natural production and habitat can be replaced. Generally, adding to or upgrading an existing facility is more favorable than building a new marina.

Marinas usually have impacts similar to those of port facilities, although on a smaller scale (see previous section). Some specifics for marinas follow:

- Where a marina is located may be as important as its design. Areas used by large concentrations of waterfowl should be avoided. Marinas should be located away from confluences of streams. Fish migration routes should not be blocked. These projects should not cause disruption of currents and tidal circulation.
- Marinas degrade water quality with pollution from gas, oil, sewage, dishwater, litter, and heavy metals from paint. Areas of poor water quality, such as near a sewer or industrial outfall, are not usually acceptable sites for marinas unless water quality problems would not be compounded. Sometimes these could be preferred sites, but you may be required to demonstrate that adequate water exchange would occur.
- Marina projects should include pump-out facilities for septic tanks of ships, and plans for handling litter and petroleum products.
- Locations that need little or no maintenance dredging are preferred. Any dredging for the boat basin must be "daylighted," i.e.,dredged to meet existing tidal elevations or channels. This must be done to prevent stranding of fish in isolated "holes" at low tides. Eelgrass beds should be avoided when dredging.
- To protect aquatic habitat, open pile work and floating breakwaters which maintain sediment movement are preferred. Solid breakwaters may be permitted if they are detached from the shoreline.
- Covered moorage is generally discouraged because of undesirable effects of shading.

Where a marina is located is as important as its design.

Large Hydroelectric Projects (greater than five megawatts)

All non-federal hydroelectric development is subject to requirements of the Federal Energy Regulatory Commission

(FERC). Proposals are reviewed by the Washington Department of Wildlife through the FERC permitting and licensing process. We also have direct involvement through your application for Hydraulic Project Approval (HPA). See chapter on HABITAT PROTECTION LAWS for FERC and HPA procedures.

In 1980, the Northwest Power Bill established the Northwest Power Planning Council. The council was directed to develop a program to ensure consideration of fish and wildlife in the development, operation, and management of hydroelectric facilities. Criteria set forth in this program must be met during future hydroelectric power development in the Northwest.

Most projects involving large reservoirs for water storage have substantial impacts on fish and wildlife resources. Major impacts from large hydroelectric projects are:

Direct habitat loss. Both terrestrial and riverine habitats are replaced by reservoirs. Terrestrial habitat loss usually includes a significant amount of riparian land which existed along the original streamcourse. Wetland communities, big game winter range, and old-growth forest also may be included. Re-establishment of riparian communities may be difficult or impossible since steep slopes and water level fluctuations cause unstable areas which cannot support a similar vegetative community. Stream habitat at the project site will be replaced by a slack water reservoir environment. Stream habitat below the reservoir will be altered by changes in flow patterns and hydraulic characteristics.

Associated projects. Additional impacts result from transmission lines, power pipelines, penstocks, powerhouse sites, new roadways, and new or replacement hydraulic characteristics.

Construction activities. Bank erosion, sedimentation, stockpiling, and dredge and fill activities damage downstream habitats.

Both terrestrial and riverine habitats are replaced by a reservoir.

Blocked fish and wildlife passage. Fish migration through the project site to upstream habitats is blocked. Spillway and turbine mortalities and the tendency of downstream migrants to take up residence in the reservoir also contribute to decreased fish production. Wildlife migration pathways are blocked by the reservoir or other project features.

Changes in water levels. Fluctuations in discharge and downstream flows may cause stranding of fish on gravel bars or in potholes, disruption of spawning, and exposure of spawning areas. Water level variation may also disrupt downstream recreational use and value.

Changes in gravel recruitment. Gravel movement to downstream areas will be altered or entirely eliminated. This will have severe impact on spawning habitats downstream from the project site.

Changes in temperature. These changes may have significant impact on fish, depending on local conditions, type and depth of project outlet structures, etc.

Loss of food supplies. Changes in plant communities and fish and insect populations will affect downstream fish and wildlife.

Loss of recreation areas. There will be a direct loss of recreation in areas flooded by dams. Stream fishing will be curtailed or even eliminated. Downstream recreation opportunities and quality also will be diminished by regulation of water flow and incresed turbidity.

Fish and wildlife have been harmed by hydroelectric development in the past and could be impacted even more by future developments. Maintaining wild natural fish and wildlife populations is our goal. Impacts must be measured against this goal when planning mitigation and compensation.

Resource impacts and appropriate mitigation plans vary widely and are highly site-specific. Requirements for construction, instream flows, screening, ramping rates, turbine bypass, etc., are specified for each project. Following are typical provisions for mitigation of habitat loss. (Other conditions listed in SMALL-SCALE PROJECTS section may also apply.)

- Baseline studies are necessary to determine site-specific fish, wildlife, and habitat values. These must be completed early in planning, and include identification of potential impacts. Plans for flows and fish facilities must be completed prior to construction.
- Post-project studies help determine actual impacts and design of mitigation plans.
- Monitoring is needed to determine success of mitigation efforts.
- Purchase or preservation of off-project lands may be required to compensate for habitat losses.
- Key habitats must be preserved. Projects may have to be modified to avoid impacts.
- Habitat enhancement may also be required to increase productivity by supplying food, cover, and water.
- Disturbed areas must be restored to former or improved conditions. Disturbed areas must be revegetated, stream channels restored, wetlands created, etc.
- Power conduits and penstocks must be designed to allow wildlife continued use of traditional pathways. Rights-of-way must incorporate adequate topographic and vegetative cover and forage. Use of herbicides should be prohibited.
- Migratory and resident fish must have access to critical habitats. Upstream and downstream passage must be provided as an integral part of design.
- Adequate flow regimes must be provided downstream, to maintain desirable temperature and

Maintenance of wild, natural populations of fish and wildlife are our goals.

water quality. Flows must be provided to prevent loss of fish habitat in the bypass.

- Project operations must be compatible with down-stream resources. Operational ramp rates (flow fluctuation rates) must be identified to avoid fish stranding or other productivity problems.
- Plans for meeting the wildlife and fishery potential of the reservoir must be made. These may range from developing self-sustaining fisheries to various levels of artificial supplementation. Diking back-water sloughs, and creating islands and nesting areas can increase wildlife value of reservoirs.
- Public access must be preserved and, where appropriate, enhanced.

Intakes must be screened even if the project is above the anadromous fish zone.

Small Hydroelectric Projects (less than five megawatts)

Small hydroelectric developments may have adverse effects on fish and wildlife. We are concerned about cumulative impacts of numerous hydro projects located on a river basin. Small, or intermittent streams are crucial to fish production.

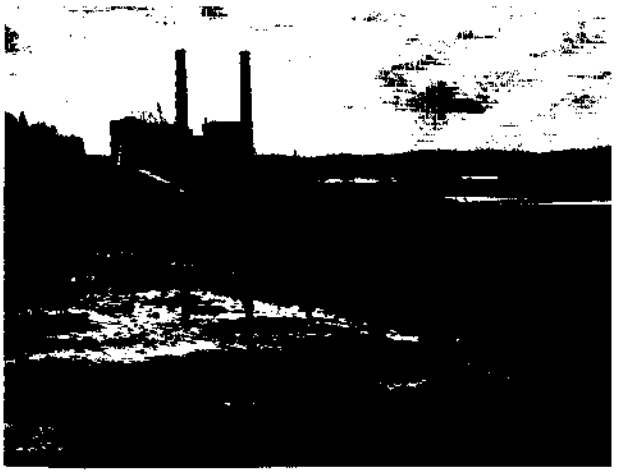
As with large projects, the Federal Energy Regulatory Commission (FERC) is the licensing authority. You will need Hydraulic Project Approval (HPA) and probably a water right (see chapter on HABITAT PROTECTION LAWS). Early consultation with resource agencies is recommended. To eliminate unnecessary delay and additional paperwork, we suggest you satisfy FERC first, then apply for an HPA when construction plans are developed.

Impacts, although smaller in scale, are similar to those of major hydro projects and are listed in the previous section. Some specifics for small hydro projects follow:

- Maintaining adequate flow regimes and fish passage is important with these projects. You may be required to investigate instream flows.
- Ramping rates, turbine bypass flows, rearing flows, and spawning flows data must be provided in project plans to protect fish.
- Project sites should be upstream of anadromous fish habitat or the powerhouse should be located at the base of an impassable barrier.
- Intakes must be screened even if the project is above the anadromous fish zone to protect juvenile fish from going through turbines. Screening regulations are usually specified as part of your HPA (see SMALL-SCALE PROJECTS, Intakes and Other Water Diversion Structures).
- Construction areas, including pipelines, access roads, reservoir and powerhouse margins, must be revegetated to prevent soil erosion and preserve wildlife habitat. This is especially important in riparian areas, which should be left in pre-project condition.
- In some cases, you may be required to acquire land and dedicate it to fish and wildlife.

Thermal and Nuclear Power Plants

For large-scale thermal or nuclear power projects, all state permitting authority rests with the Energy Facility Site Evaluation Council (EFSEC). Developers must apply to EFSEC for site certification. If granted, all related state permits, such as HPA's, are automatically issued. Our concerns, including conditions for work in state waters, are addressed through EFSEC proceedings.



Buildings, visitor areas, parking lots, lay-down areas, roads, etc. occupy what often used to be productive wildlife areas.

The following list summarizes the major areas of impact to fish and wildlife:

Direct habitat loss. Buildings, visitor areas, parking lots, lay-down areas, roads, etc., occupy what often used to be productive wildlife areas. Fencing can aggravate this loss.

Associated projects. Pipelines and powerlines also impact habitat. See sections on these specific projects.

Disturbance. Human activity is incompatible with certain species of wildlife.

Water withdrawals. The quantity withdrawn can significantly reduce the capacity of a river to support fish life. If a dam is built to maintain adequate supply, another set of impacts is introduced (see section on Hydroelectric Projects).

Water discharge. High temperatures and certain pollutants from discharged water can adversely affect fish and organisms they feed upon.

Sedimentation. Construction and operation can lead to stream siltation. The resulting impacts are discussed at the beginning of the SMALL-SCALE PROJECTS section.

Site certification agreements state that fish and wildlife losses must be replaced. The Washington Department of Wildlife will help you develop an appropriate mitigation plan; if there are impasses they will be resolved by EFSEC. The general types of provisions are:

- Study the project site to determine habitat values and existing fish and wildlife use. Determine impacts and develop mitigation plan. Purchase and enhance land off site. Specific acreages are determined by value of lost habitat and enhancement options.
- Develop management plans for associated pipeline and powerline corridors (see sections on these project types).
- Replace lost fish production (see section on Hydroelectric Projects). Maintain fish passage facilities, construct net pens, improve stream or lake habitat and fund hatchery production.
- Timing and other conditions for instream work are specified in place of a separate Hydraulic Project Approval.

Geothermal Development

Geothermal development generally involves the use of heat generated within the earth and brought to the surface

by high temperature fluids or brines. The actual application of a geothermal resource depends on temperature and chemical composition of the fluids and proximity of the geothermal field to population centers and markets. High temperature fluids may be used for electrical power generation. Uses for lower temperature fluids include fish farming, hydroponics, pulp and aluminum processing, space heating, irrigation, chemical industry processes, drying of organic material, and canning.

Very little geothermal development has occurred in Washington. Most potential locations are at high elevations in the Olympic and Cascade Mountains and in portions of the Columbia Basin. Most of these lands are relatively undisturbed by human development and intrusion. These areas are also extremely valuable for fish and wildlife. The following impacts from geothermal development could seriously affect these resources:

Direct habitat loss. The losses can range from several acres for drill pads to several thousand acres for full field development. Corresponding numbers of wildlife are lost as a result.

Obstacles to fish and wildlife movement and migration. Pipelines and transmission corridors may block movements of big game animals such as deer, elk and mountain goats.

Accidental spills and releases of hazardous materials. Geothermal fluids and drilling muds contain contaminants which degrade water quality and can kill fish even at very low concentrations.

Air emissions. Plants up to one-quarter mile from cooling towers are affected by emissions of ammonia, hydrogen sulfide, and boron.

Stream siltation. Grading and clearing for road construction, well pads, and transmission lines expose large amounts of soil. This results in erosion and runoff to small streams and rivers. Impacts on fish are discussed at the beginning of the SMALL-SCALE PROJECTS section.

Goats, in particular, are attracted to substances containing salt.

Reduced instream flows. Many operations require large amounts of water. Withdrawal of surface water reduces

stream flow. This can result in less available spawning area and less food for fish. Because riparian corridors are affected, wildlife can also be impacted.

Thermal loading. Geothermal activities can generate large amounts of waste water. Discharge of this "warm" water increases stream temperature with resultant impacts on fishery resources.

Mud pits for drilling fluids and evaporation ponds. These facilities are depositories for chemicals which can be extremely dangerous to wildlife. Waterfowl, other game birds, and small mammals are attracted to these areas and can die from drinking contaminated water or landing on it.

Avoidance of critical habitat areas, isolation of toxic materials, restoration of impacted sites, and purchase of off-site mitigation lands are typical mitigation measures appropriate for geothermal developments. As with other large projects, it is best to contact resource agencies early in the planning process so that their concerns can be reflected in the original design. Some typical provisions follow:

- Big game winter ranges (areas below 2500 feet) should be avoided. Present ranges are limited and at carrying capacity.
- Habitual breeding areas for elk, deer, and goats should be protected. Human activity should be held at a minimum level during peak breeding periods
- Any area containing high concentrations of fawning, calving, or kidding game animals should be avoided. Goats and elk are usually more restricted to specific habitat areas during May, June, and July than are deer. Human activity should be held to a minimum during May through July, even in areas where leases are granted.
- No geothermal activity should be allowed in areas known to be major movement routes to either summer or winter ranges. No barriers to free movement between ranges should be allowed.
- Road, pipeline, and powerline construction should be held to a minimum in areas below 2500 feet critical winter range.
- Buffer zones should be maintained between all geothermal activity zones and critical habitat types, such as winter ranges, calving, kidding or fawning areas, wallow sites, breeding areas, migration corridors, etc. Buffer zones for winter ranges should extend from 2500 to 3000 feet in elevation. The majority of geothermal development should be restricted to areas above 3000 feet.
- Toxic substances from wells, used oil, etc., should be disposed of immediately. Settling ponds should be fenced and/or covered to prevent use by birds and mammals. Goats, in particular, are attracted to substances containing salt.
- The use of geothermally developed areas by hunters should be evaluated. Access should not be limited unless all other alternatives (burying pipes, partial closures, safety zones around plants and drilling rigs, etc.) fail.
- Any critical habitat should be immediately restored by the lessee and abandoned.
- The lessee must restore all areas to their natural states following unsuccessful exploration, or after a successful well becomes uneconomical and is abandoned.

Surface Mining

With adoption of a regulatory program for Washington, all coal mining operations in the state will be primarily under federal law, administered by the Office of Surface Mining (OSM). The regulations are fairly strict, and provide a good deal of protection for the environment. However, significant impacts to habitat are still likely.

The greatest impact comes from excavation. Habitat is removed directly to allow mining. Roads, railbeds, processing facilities, stockpiled topsoil, etc., usually cause loss of large acreages of habitat. Stream channels often must be altered; problems arise with acid runoff from mine tailings and with the spread of coal dust.

With the new federal program in force, the Washington Department of Wildlife's involvement with coal mines is three-fold: to help pinpoint areas of the state which should be designated unsuitable for surface mining (critical habitat for threatened and endangered species is one criterion for this designation); to determine how much background data should be obtained by the developer on existing vegetation, habitats, and fish and wildlife; and to review rehabilitation plans and recommend options to benefit fish and wildlife.

The Washington Department of Wildlife looks for rehabilitation which will restore fully the habitat value lost to mining operations. Especially important are wetlands and riparian zones. In most cases, the developer will plan a post-mining change of land use. Frequently, areas that were unmanaged forests are to become farms or housing developments when mining operations are finished. In such instances, enhancement of greenbelts or special habitat areas is needed to reclaim as much wildlife productivity as possible. New wetlands might be created. A key element is to establish a diversity of vegetation in carefully planned patterns. Specific measures must be tailored to the characteristics of the mine site.

Habitat is removed directly to allow mining.

Transportation Corridors

Roads and highways. Roads and highways in Washington occupy about 500,000 acres. This is direct loss of habitat and a major impact of road building projects. In addition, effects are especially severe when valuable habitats are taken for highway corridors. Some general impacts from road construction are:

Direct loss of habitat, including critical areas.

Disturbance. Primary roads significantly reduce wildlife numbers (especially elk) within one mile and secondary roads within one-quarter mile. Even primitive roads are measurably affected.

Disruption of migratory routes. Roads often follow riparian areas or intersect wildlife corridors and impede migration.

Indirect habitat loss. Important areas may be used for borrow, fill, or spoil from highway construction.

Stream channel alteration. Project designs often require channels to be relocated. Potential impacts are described under SMALL-SCALE PROJECTS section.

Road kills. When wildlife travel routes are blocked, road kills increase.

Impeded public access. With poor highway design, popular hunting and fishing areas may be closed to the public when they are not considered in highway design.

The Washington Department of Wildlife's primary objective is to preserve habitat. We contact road-building agencies early in the planning process so that our concerns

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can be worked into initial designs. We then make a series of site-specific recommendations, which may include some or all of the following:

- Conduct a baseline study to identify critical habitat or wildlife of special concern.
- Locate highway right-of-way to avoid critical habitat. When this is not possible, you may be required to restore other areas or purchase land for wildlife use.
- Plant vegetation screen to reduce visual and noise disturbance to wildlife.
- Identify proposed borrow and spoil sites and locate them away from critical areas. Topsoil will have to be saved and the site revegetated with species beneficial to wildlife.
- Use fencing to control wildlife travel patterns near roads. Proper design is necessary to keep animals from being trapped in the highway corridor. Build wildlife underpasses to reduce hazard to traffic and animals.
- Place reflectors on highway shoulders to discourage wildlife from crossing.
- Plan public access to hunting and fishing areas.

In addition, road construction often involves various forms of instream work. Conditions stipulated for bridges, culverts, bank protection, gravel removal, and intake and outfall structures can be found in the SMALL-SCALE PROJECTS section of this pamphlet.

Powerlines. It is estimated that high voltage transmission corridors will total 19,200 miles and occupy 290,000 acres by 1987 in the Northwest Power Pool area (Washington, Oregon, Idaho, and Montant). Washington produces over 60% of Northwest electricity and has the most powerlines. The extent of smaller lines is not estimated, but would add substantially to the total affected area.

Potential impacts on fish and wildlife come from establishing the corridor and placing powerlines.

These include:

Loss of wildlife habitat. Cover and forage are removed to make room for powerlines, especially in forested areas.

Interruption of wildlife migration routes.

Increased human access to back country areas. This increases harassment and makes poaching easier.

Erosion and sedimentation. When vegetation is removed, soils are exposed and easily eroded. Sediments can be washed into nearby streams and impact fish habitat.

Birds are killed. Mortality occurs when they collide with wires or are electrocuted.

Herbicide damage. Spraying reduces amount of food available to wildlife along the right-of-way throughout the year.

In initial planning stages, we recommend a route that avoids critical habitat areas. Whenever possible, existing rights-of-way should be used.

Wildlife can be benefited through managing habitats created by the corridor. The key is to provide diversity. In general, rights-of-way should be broken up with pattern of

shrubs alternating with open forage areas about every 1200 feet. Riparian areas can be created by developing seeps and small creeks. Small groups of four or more fruit trees can be planted at intervals along corridors. These provide food and cover and are short enough to not interfere with powerlines. Large trees should be retained where lines are strung high enough to allow it, as in valley crossings.

Following are recommendations we may make:

- Undertake baseline and monitoring studies.
- Use existing rights-of-way where possible to avoid critical habitats.
- Establish favorable vegetation; use fertilizers when necessary.
- Manage cover vegetation with 1200-foot rotation sections to reduce line-of-sight distances.
- Eliminate herbicide spraying. Healthy grass and shrub communities provide forage and may discourage trees from re-establishing.
- Retain mature trees where height of lines allows.
- Where possible, top trees rather than eliminate them.
- Establish cover lanes for big game crossings.
- Leave brush piles and snags for wildlife.
- Schedule construction from July through November to avoid impacts on nesting birds and wintering areas.
- Avoid riparian areas.
- Provide wide spacing of wires to prevent electrocution of birds of prey.
- Build perches and roosts on towers.
- Close corridor access roads.

Pipelines. Impacts from pipeline corridors are largely the same as those for powerlines but stream crossings can cause additional problems. Our mitigation and management concerns can be learned by reviewing the previous section on powerlines and the SMALL-SCALE PROJECTS section on pipelines crossings.

SUMMING IT UP

For you as builder or developer, learning the demands of environmental permits can be complicated and frustrating. If you read this pamphlet and designed your project according to its suggestions, you should have fewer problems. It is usually possible to carry out your construction while strictly limiting impacts on fish and wildlife. This is what we aim for with our recommendations and permit conditions. The pamphlet can help you find the best design.

As a final note, we encourage you to telephone any Washington Department of Wildlife office if you have any questions about the pamphlet's contents. We'll be glad to help.

Washington Department of Wildlife

Serving Washington's wildlife and people—now and in the future

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